

FINAL REPORT

Spring Mission: March 20, 2012 – April 25, 2012

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“Conservation and Documentation of the Wall Paintings at the Red Monastery, Sohag”

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TABLE OF CONTENTS

1. INTRODUCTION	P. 3
2. WORKING METHODS	P. 4
3. STATE OF PRESERVATION AND PREVIOUS RESTORATION WORK	P. 14
4. RESTORATION WORK CARRIED OUT	P. 20

INTRODUCTION

This report covers work performed under the sub-grant, “Conservation and Documentation at the Red Monastery, Sohag”, an activity of the Egyptian Antiquities Conservation Project (EAC) funded by the United States Agency for International Development (USAID). The American Research Center in Egypt (ARCE) was awarded the EAC project agreement in July 2004. The following report describes work performed from March 20th to April 25th 2012.

The conservation campaign conducted in the Monastery of St Bishoi (Red Monastery) at Sohag¹ during the spring of 2012 involved the following parts of the building: the central dome and the four horizontal pendentives built by the Comité, the central window on the west wall of the clerestory and the stone entrance arch to the Sanctuary. On the same wall, the paintings of the two peacocks flanking the arch were also completed (Figure 1).

In the facade area (F-north wall) work continued on the lower part of the Saint on Horseback and cleaning of the associated Coptic inscriptions was completed. Work was carried out on the string course at the base of the east apse and, in the same lobe, on half of the central niche in the lowest tier. Also in the facade area, all the internal splays of the windows were pointed and the dust was removed from the upper parts of the facade.

During this season, architect Dr Nicholas Warner installed new stone replacements for a number of small semi-columns and two lintels missing from around the windows in the upper part of the clerestory. A semi-capital in the facade area was also replaced². Following this, pointing work was carried out around all the new pieces of stonework.



(Figure 1)

¹ The restoration team comprised: Alberto Sucato, Emiliano Ricchi, Emiliano Abrusca, Emiliano Albanese, Luigi De Prezzo, Chiara Di Marco, Valentina Periproto and Diego Pistone.

² See Dr Nicholas Warner's architectural report.

All pointing work inside the niches was completed in the north corridor (NEB).

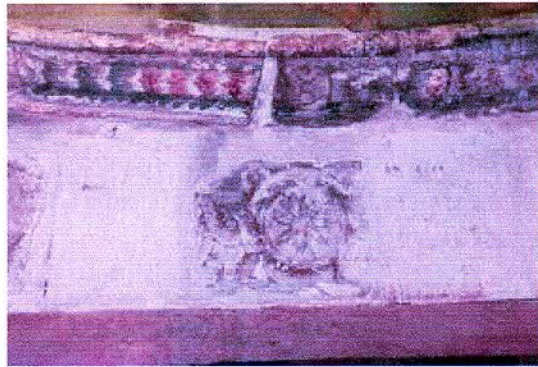
During this season, two fragments of second-phase plaster removed from the east apse in the autumn of 2010 were replaced.

All operations and areas of restoration work were comprehensively photographed throughout the campaign.

WORKING METHODS

Architecture

The triconch is built of blocks of limestone from local quarries, infilled with fired bricks. The niches in the lowest tier are built of fired bricks measuring approximately 19 x 9 x 11 cm, arranged horizontally lengthways. The moldings and semi-capitals are made of limestone. The string courses separating the tiers are also made of limestone (Figure 2).

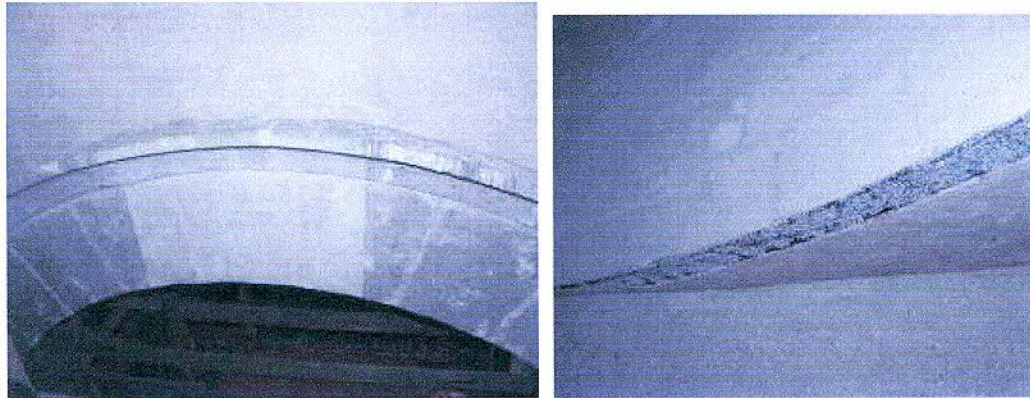


(Figures 2 and 3)

The north wall of the facade area and the north side of the corridor (NEB) were rebuilt after the structural collapse that occurred during the medieval period using fired bricks bedded in gray lime mortar.

The central dome restored by the Comité is built of perforated bricks laid on an iron ring (Figure 5) that functions as a base and rests on the top of the clerestory some 80 cm above the windows. Perforated bricks were used because the structure had to be light. The entire

upper part of the clerestory was rebuilt by the Comité using fired bricks bedded in lime mortar (Figure 3).



(Figures 4 and 5)

Plaster³

In the niches of the lowest tier of the east lobe the palimpsest comprises three levels: the oldest, that has proved impossible to examine in the areas restored, has been identified as the first phase of painting in the triconch. It is uniform with a fine white wash [*covering*] the surface of the stone and the masonry (Figure 6).

³ In order to simplify and clarify terminology describing the late antique plaster palimpsest of the Sanctuary and for the sake of conformity with the nomenclature to be used in the future publication, henceforth the plaster types will be identified as follows: PREPARATORY PHASE (P) (formerly known as FIRST PHASE), mud- and straw-based plaster with red coloring identified only in the east apse; FIRST PHASE (formerly known as SECOND PHASE), the beardless figure of Christ enthroned and the twelve apostles ranged below (east apse), geometric chessboard motifs visible where plaster has fallen off the walls of the first tier in the east lobe, etc; SECOND PHASE (formerly known as THIRD PHASE), geometric motifs painted using the encaustic technique in the lowest and first tiers of the entire triconch, tops of trees and red apples painted using the encaustic technique in the south apse, etc ; THIRD PHASE (formerly known as FOURTH PHASE), Virgo Lactans and Christ Pantocrator in the north and south apses of the Sanctuary respectively, saints inside the niches of the first and second tiers of the triconch, etc.



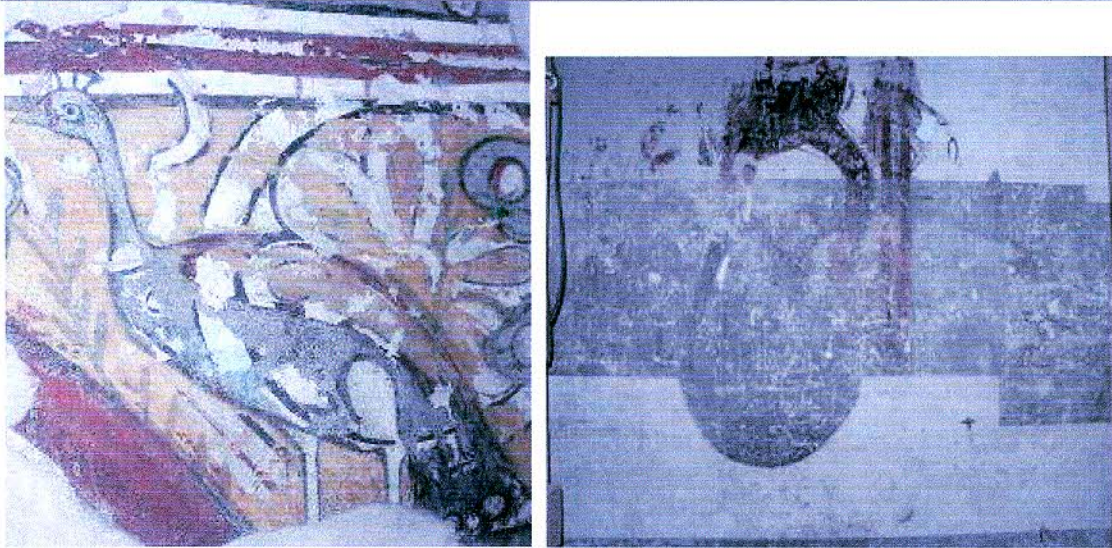
(Figures 6 and 7)

This first thin layer is covered by the second-phase plaster. This was applied in a layer approximately $\frac{1}{2}$ to 1 cm thick and is lime-based with inclusions in the form of smooth round grains of sand. It has a white surface finish (Figure 6). Here the second-phase plaster has a much smoother surface than it does in the upper tiers. This plaster is covered by the third and final late-antique phase with its trademark white wash.

In the central niche that has been partially restored to half its height, three phases are visible. The two latest (more recent) are in the form of painted washes covering the second phase. Whilst in the two lateral niches the second-phase plaster is only covered by a third-phase wash, in the central niche, there is also a later white wash possibly applied during the medieval period (Figure 7).

In the same lobe, only a few of the original stone blocks bearing portions of painted plaster have survived on the string course that separates the second tier from the apse. The plaster on these blocks is second-phase, completely reworked by the artist of the third phase who has covered it with his trademark white wash.

In the facade area (F-north wall) the plaster is medieval, applied when the external walls were rebuilt. This plaster, contemporary with the monochrome painting of the cross on the left side (now interrupted by the wall built by the Comité that leans against it), as already described in the autumn 2011 report, comprises lime and sand with a good deal of straw in the mix (Figure 9). The same plaster is also present on the north side of the north corridor. On the west side of the clerestory, like the other three sides that have already been restored, third-phase white wash overlies the second-phase plaster (Figure 8).

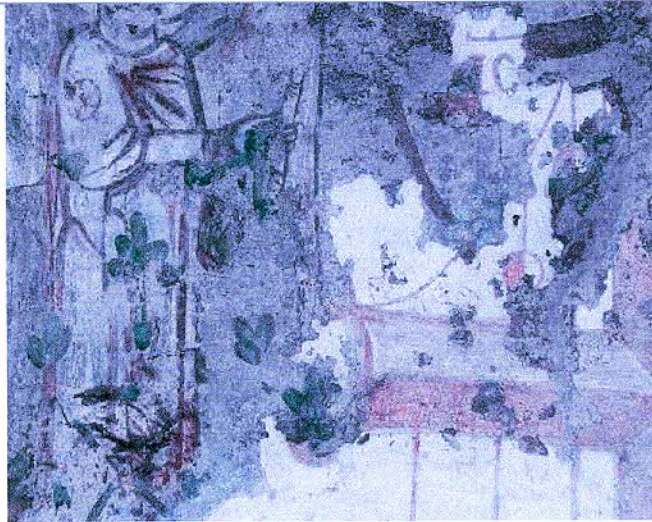


(Figures 8 and 9)

Paint layer

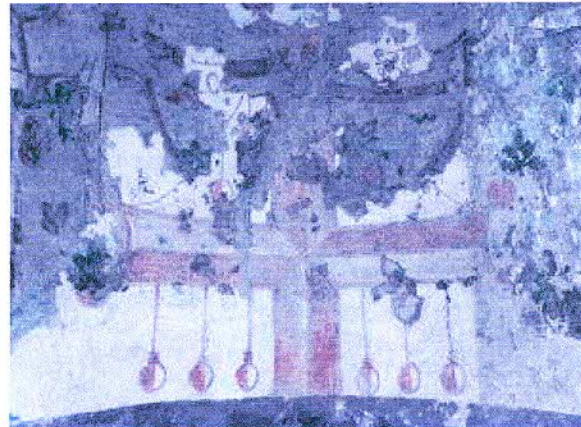
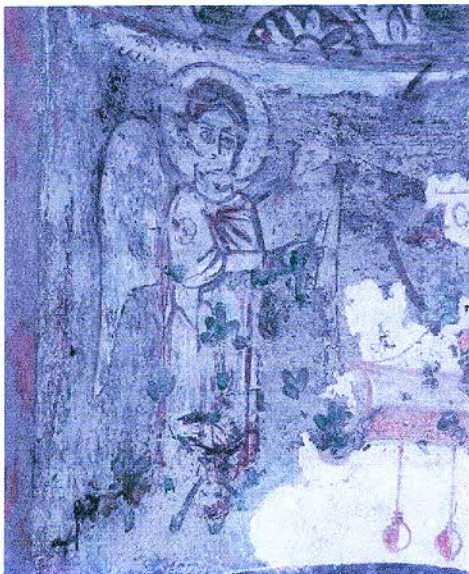
Cleaning of the central niche in the lowest tier of the east lobe revealed a new palimpsest with a later phase overlying the layers of late antique plaster. The oldest painted plaster, visible only in limited areas, depicts *velaria* and floral patterns painted using the encaustic technique typical of the second phase. This is extremely significant because it shows that during the second phase of late antique painting, the niches of the east lobe were only decorated with painted *velaria*⁴ and not representations of human beings (Figure 10).

⁴ It is possible that for this lobe the same holds true for the preceding first phase.



(Figure 10)

This plaster is overlaid by the succeeding phase in the form of white wash. The quality of the white wash suggests the third phase but the poor state of preservation makes it difficult to state this with certainty. The surviving fragments allowed us to identify an angel holding a scroll, facing the central *clipeus* that may originally have contained a cross, now lost. The artist has used a very restrained palette and the composition is extremely graphic with some lines in red earth (Figure 11). The small Madonna depicted in the upper part of the niche must also belong to this phase (Figure 13).





(Figures 11, 12 and 13)

In the central part of the niche this white wash is overlaid by a second layer of white on which a cross is depicted using only red earth. What appear to be six ostrich eggs are hanging from the horizontal arms of the cross⁵ (Figure 12).

Ascending to the string course between the second tier and the apse in the same lobe, the third-phase painting once more explores a geometric theme in the form of a red and white band that furls and loops around a horizontal series of *clipei* (Figure 14). This decoration is not greatly dissimilar to that on the corresponding north and south string courses.



(Figure 14)

Work on the north wall of the facade area (F) focused on the lower part of the Saint on Horseback. The back legs of the horse were restored together with the head and hand of a

⁵ We are awaiting Dr Elisabeth Bolman's interpretation of these objects before defining them definitively.

second soldier beneath the horse. A cross inscribed within a circular *clipeus* was also discovered at the same level as the abovementioned soldier (Figure 15).

Given the poor state of preservation it is difficult to say whether this precedes or succeeds the composition of the Saint on Horseback.

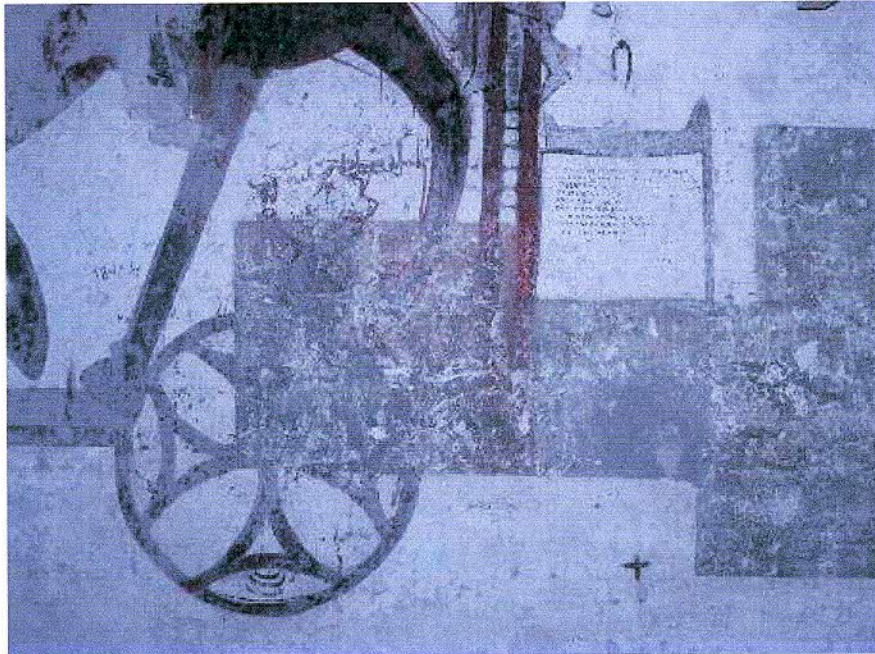


Figure 15

A Coptic inscription on the right-hand side was cleaned but proved to be extremely patchy (Figure 17).

During the season, work was completed on the two inscriptions flanking the halo of the Saint on Horseback, confirming that white lead (that subsequently turned purple) was the white pigment used for many details in this scene. Unfortunately, only part of the inscription in the right-hand cartouche can be deciphered (Figure 16).



Figure 16

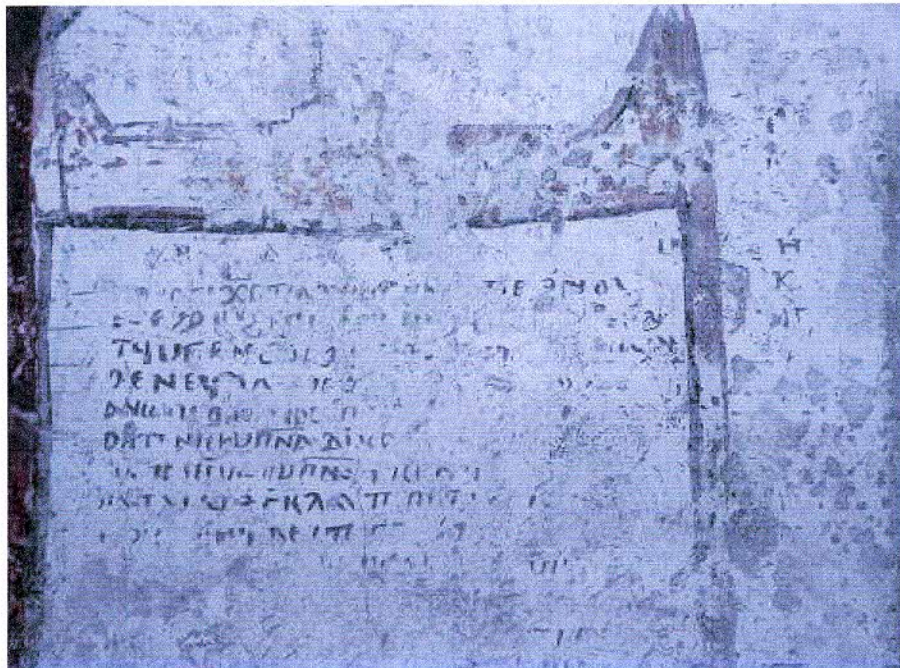


Figure 17

The other white parts of the painting such as the background were obtained by leaving areas of the plaster unpainted.

The restoration of the painted peacocks flanking the entrance arch (second phase) were completed. Only a few fragments of third-phase white wash survive on them with the geometric designs already described in the previous report (Figures 18 and 19).

The two birds are depicted on an imitation gold background painted with yellow jarosite (originally using the encaustic technique), surrounded by plants and flowers also painted using the wax technique and now only partially preserved.

On the same wall, the small central window with geometric designs on the left semi-column and floral motifs on the architrave has been cleaned. Both paintings date from the second phase and only the second shows signs of partial modification during the third phase (Figure 20).



Figures 18 and 19



Figure 20

On the outside of the arch opposite (east triumphal arch) a sizeable section of dirt was removed from the lower right-hand side, revealing the figure of a third-phase saint painted over the circular motifs belonging to the second phase. Sadly, the extremely patchy nature of the painting prevented us from finding an inscription and consequently the identity of the saint remains a mystery (Figure 21).

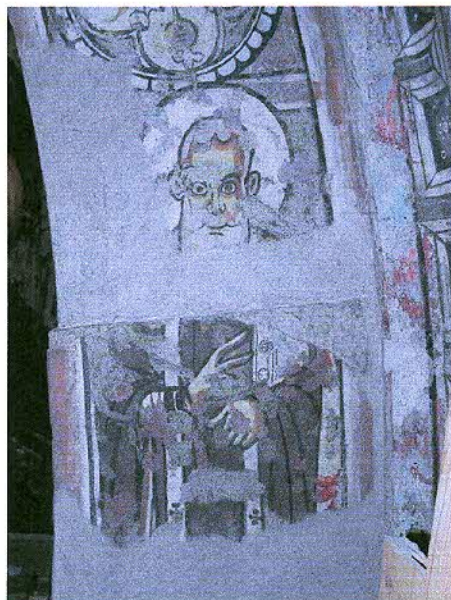


Figure 21

STATE OF PRESERVATION AND PREVIOUS RESTORATION WORK

Masonry and plaster

The east lobe suffered from structural instability at some stage in antiquity, resulting in cracks and falls of plaster as well as the collapse of the entire upper part of the clerestory and central dome. The causes and consequences of this instability were examined in the report for the Spring 2007 season⁶. Damage connected with these events can be seen throughout the building, on the plaster and paintings in the lowest tier of the east lobe, all over the wall containing the triumphal arch and throughout the upper part of the building. As previously described, the whole upper part of the clerestory suffered a serious collapse as the result of a severe earthquake and the entire area surrounding the triumphal entrance arch was tilted several degrees towards the nave (west). At the start of the twentieth century, restoration work undertaken by the Comité resulted in the structural consolidation of the Sanctuary in its entirety, the rebuilding of the triumphal arch with new stone blocks and the reconstruction of the clerestory with fired bricks and the dome with perforated bricks. All reconstructed areas were plastered with a yellow mortar rich in sand but containing little lime, then finished with a fine gypsum-based plaster (Figure 22).

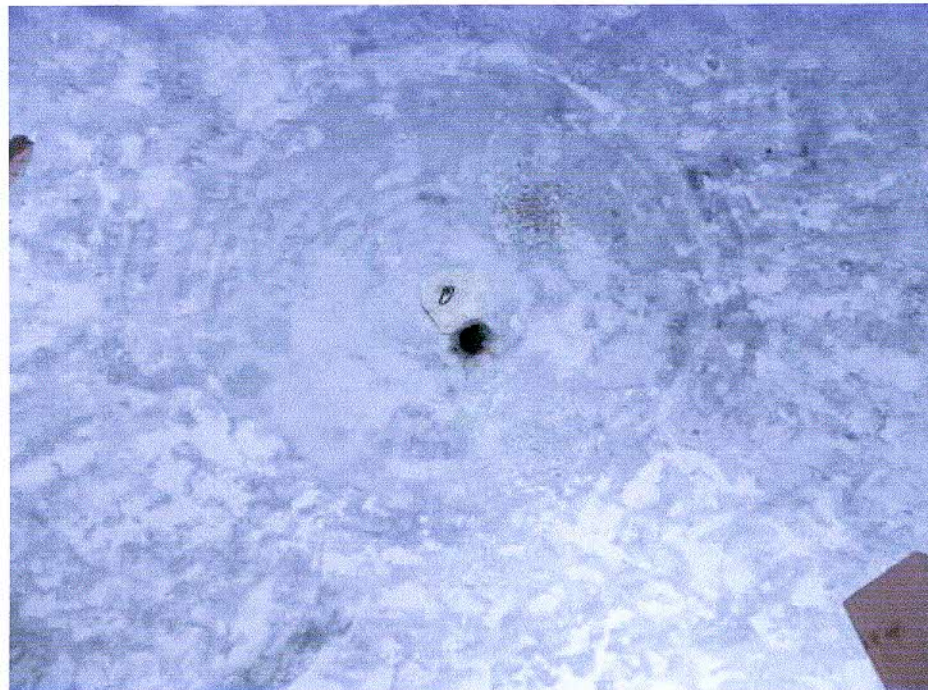


Figure 22

⁶ : L. De Cesaris, A. Sucato, Red Monastery – Monastery of St. Bishoi, Conservation of the Wall Paintings – Final Report - Spring 2007

In spite of the Comité's work, numerous signs of the serious structural problems afflicting the church remain in the form of the extensive loss of portions of plaster and deep cracks whose opposing planes are often out of alignment (Figure 23).

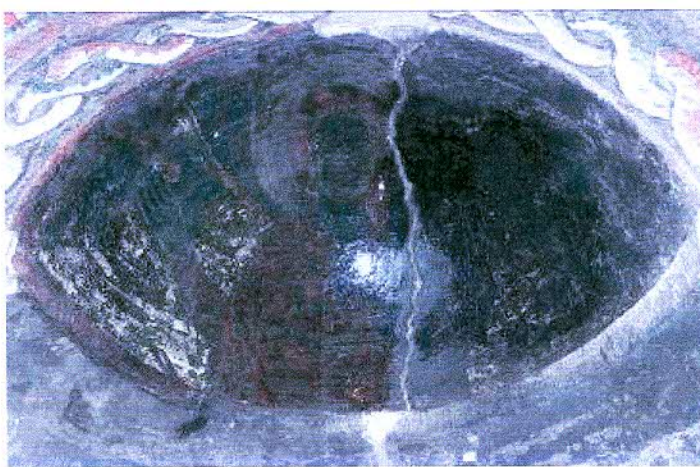
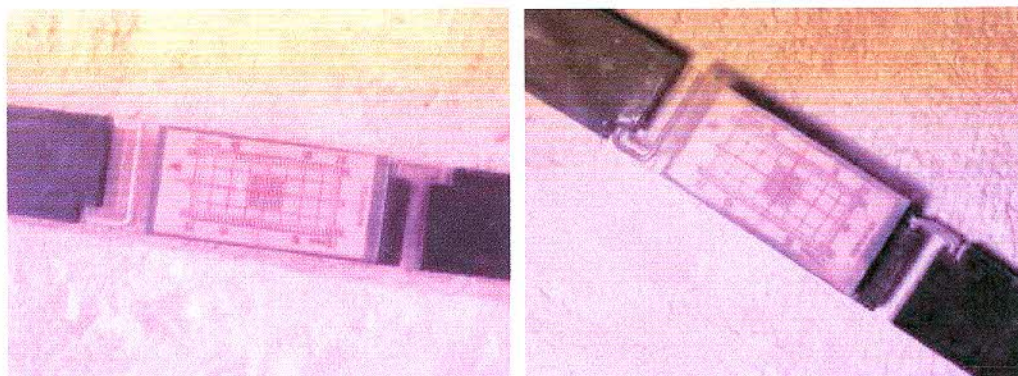
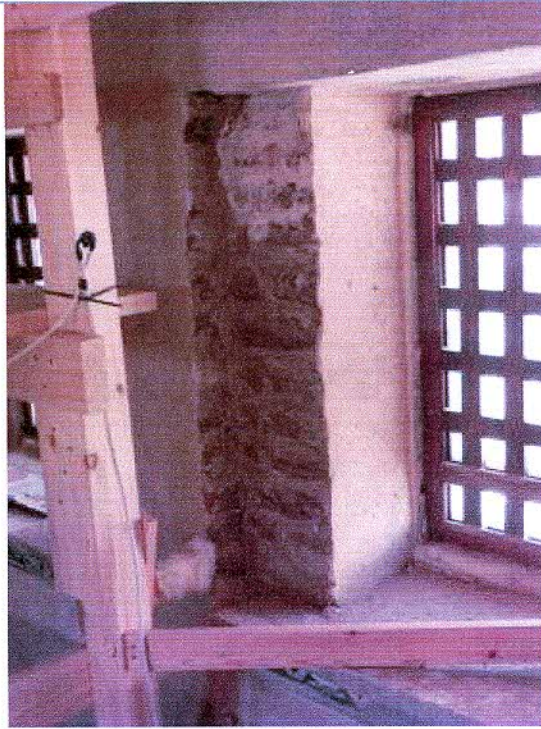


Figure 23

Two crack monitors were installed above the triumphal access arch at the beginning of the project in order to monitor new structural movements in the building. They were removed in April 2012 since no new movement or settling of the building had been registered for four years (Figures 24 and 25).



Figures 24 and 25



(Figure 26)

The old and extensive gaps in the plaster at the top of the area around the arch were rendered. At the same time, the structure was consolidated by repositioning and in some cases replacing stonework such as lintels and semi-columns around many of the twelve upper windows. In spite of this, before the present conservation project, much of this stonework was missing (Figure 26). The consolidation work was unable to save much of the painted plaster from the semi-circular string course at the base of the east apse (Figure 27).

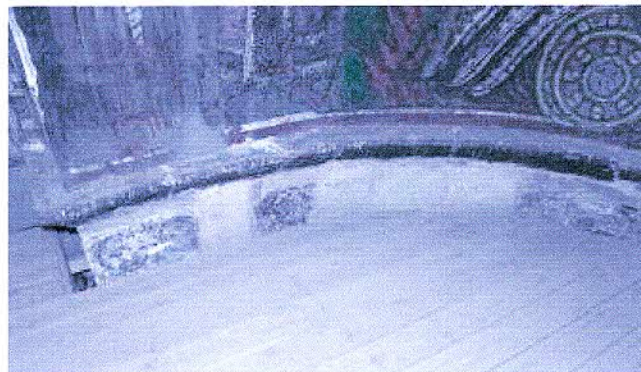


Figure 27

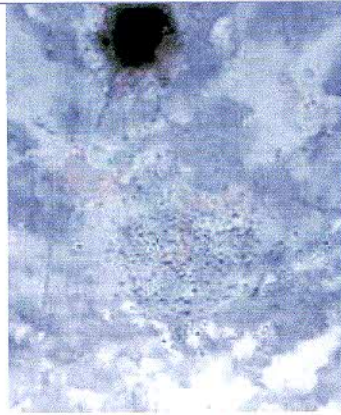


Figure 28

Similarly, the surface of the painted plaster depicting a saint discovered on the right-hand side at the base of the arch has been forced out of alignment by structural movements and a horizontal portion of plaster is missing from the center and bottom.

Finally, the grayish plaster finish of the central dome proved to be in a poor state of preservation, to the extent that it even bears the marks of shotgun pellets (Figure 28).

Paint layer

The state of preservation of the paint layer varies greatly as a result of a large number of factors summarized below:

- The properties of the materials and the stratigraphy of the palimpsest.
- Rainwater leaking in through cracks, windows and the roof. This wets and weakens the paint layer so that it becomes detached from the plaster and tiny fragments are lost. Dust and mud are deposited and saline efflorescence and blackening develop.
- Bird droppings and the establishment of insect colonies on the painted surface in cavities in the masonry and in sockets for woodwork.
- Human intervention: attempts to clean the surface, the removal of more recent paint layers in search of older ones and inscriptions, excessive amounts of sooty particulate matter and wax deposited during religious ceremonies and cleaning and maintenance operations.
- The collapse of the vaults and the roof of the nave exposed the paintings to the elements and solar radiation, particularly the upper part of the triconch and facade.

The central niche of the east lobe (lowest tier) is heavily soot-blackened as a result of its intensive use during religious services, especially since the iconostasis was moved back to the threshold of the conch, thereby confining the Sanctuary of the church to this small area. This led to the continuous use of the base of the niche as a shelf for oil lamps and candles with grave consequences for all the internal surfaces.

The blackening of the paintings inside the niche made it impossible to decipher their subjects. Furthermore, part of the surface in the center was painted with a fine layer of modern white wash that almost entirely obliterated the image (Figure 29).



Figure 29

The string course between the second tier and the apse was also heavily blackened and the plaster patchy while the upper cornice was encrusted with an extensive deposit of bird droppings. However, on the few sections of painting that remained, the third-phase white wash appeared to be cohering and adhering well to the support. This can be explained partially by the presence of the apse that went some way towards protecting this area. The painting of the saint at the right-hand side of the base of the east triumphal arch was so heavily blackened that it could not be made out.

Both the cross and the Saint on Horseback on the north wall of the facade were heavily abraded as a result of exposure to the elements for an indeterminate period (Figure 30).



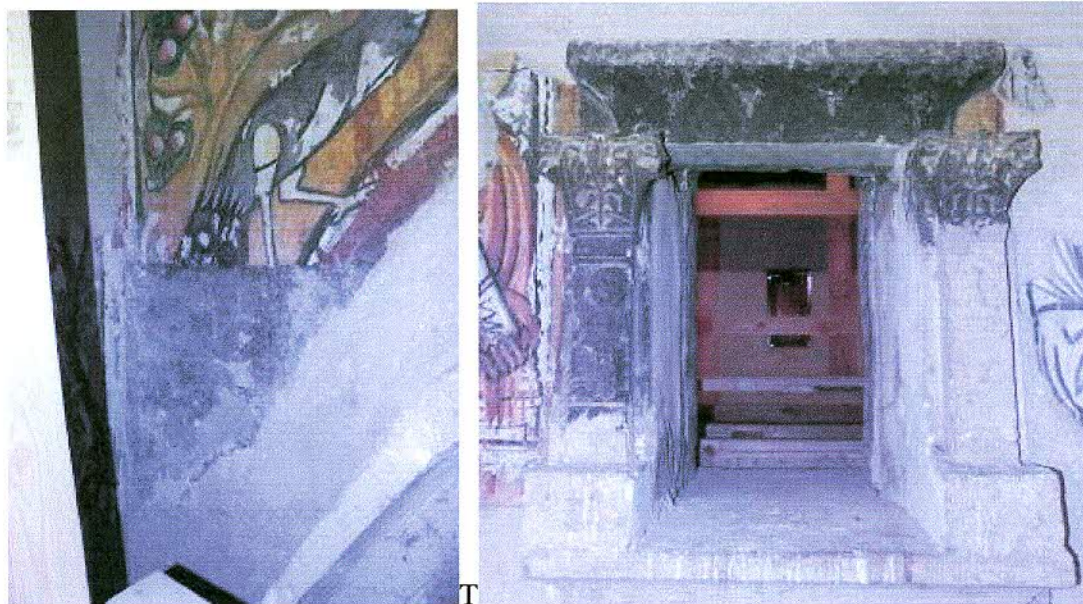
Figure 30

As stated earlier, the details of the saint's figure painted using white lead have suffered the discoloration typically associated with this pigment and turned a purplish brown. Naturally, the lower part of the saint that is more exposed and closer to passing human traffic is more abraded and damaged.

As already mentioned, there are only a few painted fragments on the west side of the clerestory. The existing paintings are covered with a thick deposit of dust and partially consolidated and unconsolidated particulate matter (Figures 31 and 32). The paintings of the peacocks, together with the painted stonework of the small central window, were damaged by wind erosion and the wetting and weakening of the paint layer so that it became detached from the plaster and tiny fragments were lost. This damage is consistent with the prolonged exposure of this tier to the elements as a result of the absence of windows and roof for a long period of time. The white wash of the fourth phase has mostly fallen off revealing the peacocks flanking the stone arch almost in their entirety.

The extensive plaster loss was caused by the poor adhesion of the whitewash to the third-phase wax-painted surface (especially the jarosite backgrounds painted using the encaustic method).

Near the wall built by the Comité, abrasion and loss of the paint layer caused by the reconstruction process can be seen.



Figures 31 and 32

RESTORATION WORK CARRIED OUT

Restoration work was carried out in accordance with the methodological guidelines first laid down in 2003. Since then, we have continued to refine and update our working methods and the materials used in response to new problems that have arisen and the need to ensure the health and safety of the conservation team and visitors.

The first task was to remove dust from the surfaces using soft bristle brushes. Where portions of plaster, fragments and elements of the paint layer (palimpsest) were in immediate danger of falling, they were secured by means of small strips of Japanese paper stuck to the surface using a 15% solution of acrylic resin (PARALOID B72) in acetone.

In some cases where this technique could not be employed owing to the extremely delicate nature of some portions of white wash, these were stuck down directly using a 15% solution of acrylic resin (ACRIL 33) after light preliminary cleaning of each fragment. This proved necessary on the edges of the white wash of the numerous exposed and fragmentary phases inside the central niche of the east lobe (lowest tier) and on the few surviving fragments of third-phase white wash on the paintings of the peacocks (west wall of the clerestory).

In places where the plaster had been repaired during earlier restoration work using inappropriate mortar, this was removed mechanically using micro-chisels and scalpels. In places where the composition of the pointing was compatible with the original plaster, it was brought to the level of the original paint layer by mechanical means, uncovering each hidden fragment of plaster and paint layer.

During the restoration season, the gray gypsum plaster covering the internal surface of the central dome was removed mechanically (Figure 33). Since the plaster was patchy and failing to cohere it was no longer performing its task of stabilizing the surface and giving it an acceptable esthetic appearance. Its removal enabled us to bring to light the natural lime- and sand-based restoration plaster applied by the Comité that has already been treated and conserved in many other parts of the building. The surface was consolidated, repaired where patchy and given a patina so that it blended in with the rest of the clerestory (Figure 35 – *sic. Trs*).



Figures 33 and 34

Repairs to plaster from earlier restoration work were carried out on all the splays of the clerestory windows (Figure 34). A mortar similar in composition and appearance to that used by the Comité was employed for this pointing work.

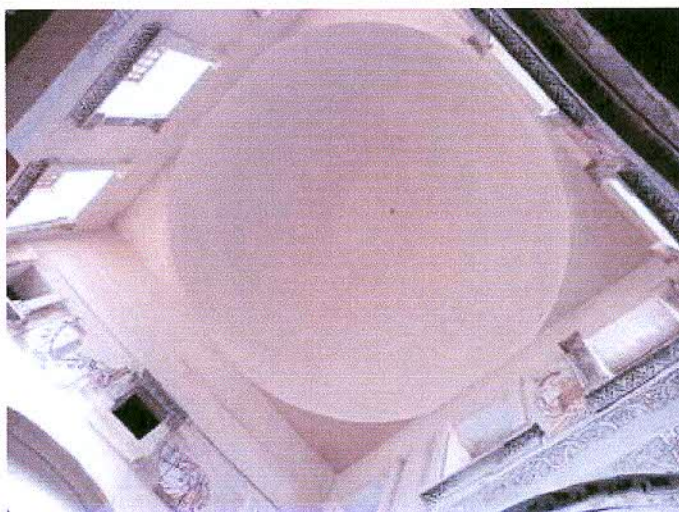


Figure 36

Where visible, the metal ring at the base of the central dome was cleaned mechanically without water, treated with a rust-converter then pointed with the mortar described above (Figure 37). The adhesive power of the metal was improved by sticking grit to it with acrylic resin.



Figure 37

The gaps in the late antique plaster were repaired using mortar similar in appearance and composition to that originally used. Hydrated lime, local sand and a low percentage of powdered local limestone (1½ parts lime, 2 parts sand and 1 part powdered limestone) were used in the mix. This mortar was used to repair the string course between the second tier and the apse of the east lobe where many of the stone blocks were visible, including those replaced during earlier restoration projects (Figure 38).



Figures 38 and 39

The gaps in the plaster on the north wall of the facade and along the sills, jambs and floors of the three niches in the north corridor (NEB) were repaired using a different mortar, similar to the medieval plaster types (4 parts lime, 1 part sand, 1 part powdered limestone, ½ part straw) (Figure 39). Also on the north wall of the facade, in the second tier, the holes that during the medieval period held wooden beams to support the floor of the *matroneum*

along the nave were pointed to just below the level so that they remained visible (Figures 40 and 41).



Figures 40 and 41

All restoration mortar was formulated to have a lower mechanical resistance than the original plaster and was used whilst respecting all levels of the palimpsest, taking care not to cover any phase of painting.



Fig.42

The plaster was consolidated by injecting it with a liquid mortar whose composition was similar to that of the original plaster. Micro-pointing was carried out in the cracks and on the edges of gaps in the plaster to prevent the injected mortar from leaking out.

In urgent cases, small fragments of detached plaster were replaced using a mortar based on 35% acrylic resin (ACRYL 33) in an aqueous emulsion bulked out with micronized calcium carbonate until the desired consistency was reached.

Raised areas of the paint layer and original white wash in imminent danger of falling were stuck down by means of injections of 15% acrylic resin (ACRYL 33) (Figure 42) in an aqueous emulsion. In some cases slight pressure with a flexible spatula was required, interposing a sheet of polyethylene between the spatula and the surface. This proved particularly necessary on the palimpsest of washes inside the central niche in the lowest tier of the east lobe.

Inside this niche, a modern wash concealing part of the internal surface had to be carefully removed using mechanical means before cleaning with chemicals could take place.



Figure 43

The cleaning system we have developed for the painted surfaces and stonework has proved effective and safe as far as concerns the materials used. The cleaning system involves the use of organic solvents applied using Japanese paper covered with several thicknesses of single-ply paper tissue to dissolve the substances on the surface (oil- and resin-based varnish) and minimize mechanical removal methods.

In brief, we proceeded as follows: removal of varnish (oil- and resin-based) alternately using the organic solvents ACETONE and DIMETHYL SULFOXIDE dissolved in acetone at 50%) applied on single-ply paper tissues until evaporated. This operation had to be repeated several times inside the central niche on the ground floor of the east lobe. Each application of solvent was followed by the application of acetone in the same manner in order to encourage the evaporation of the solvent just used. The residue of oily substances applied to the surface and repainting work were removed with a pH controlled polar solution (70 g/l ammonium carbonate in distilled water). The solution was applied to the surface using several thicknesses of single-ply paper tissue with contact times varying between 3 and 5 minutes. We then went on to remove sooty deposits, oily residue and thin films of saline efflorescence using a slightly basic polar solution (10 drops of ammonia per liter of distilled water) applied on single ply paper tissues and working in small areas at a time (Figures 44 to 47). Thicker saline efflorescence was removed mechanically using a scalpel.



(Figures 44 and 45)



Figures 46 and 47

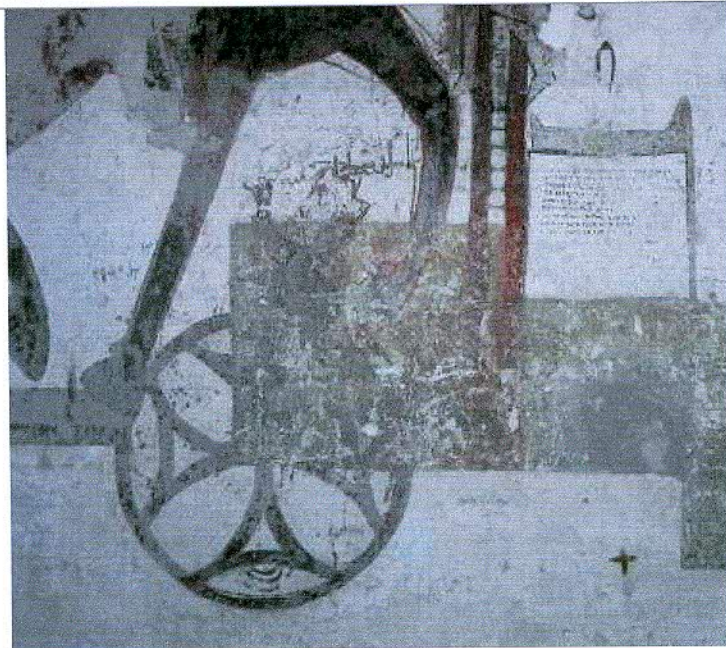


Figure 48

Consolidated deposits of dirt made up of particulate matter and carbon residues were removed by dabbing with a simple solution of ammonium carbonate (70 g/l in distilled water). In some places a sheet of Japanese paper was placed between the pad and the surface and the pad rolled over it. The latter system was used on the scene of the Saint on Horseback (façade, north wall) where the paint layer was particularly fragile (Figure 48). The black lines around figures and decorative elements added as a finishing touch to the painting process were particularly fragile in some instances. As a result, after preliminary cleaning, some of them had to be fixed with a solution of acrylic resin (5% PARALOID B72 in Dovanol) applied with a brush. Once the cleaning operation was completed, the fixing was removed with organic solvents applied through Japanese paper.

The limestone elements of the triumphal entrance arch were cleaned by applying compresses made up of a medium (wood pulp) and a moisture retainer (TYLOSE) added to a solution of inorganic salts. This compress was easy to apply for different contact times, some of them quite long, without soaking the stone unduly.

Once the compress was removed, the stone was rinsed using sponges and soft-bristled brushes.

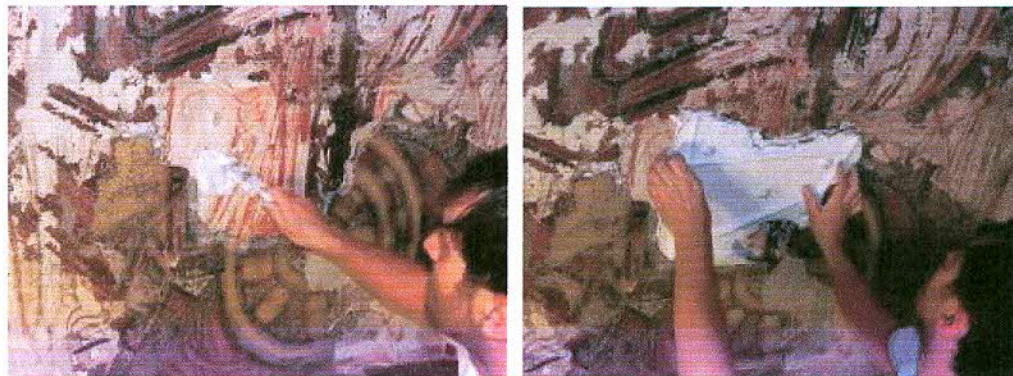
Areas where the paint layer was failing to cohere were consolidated with the application of a low percentage solution of acrylic resin (PARALOID B72) at 1.5 % in a nitro-thinner, applied with a nebulizer and, where possible, a brush.

The gaps in the paint layer were blended in using the technique of toning down with watercolors (WINDSOR & NEWTON). This technique restores legibility to the palimpsest of decoration and painted surface and clarifies the reading of the different paint layers (Figure 49).



Figure 49

The two pieces of second-phase plaster removed from the east apse in the autumn of 2009 (*date given earlier as 2010 – Trs.*) were returned to their original place. Before the fragments were replaced, the areas were treated with acrylic resin in order to isolate the paint layer from the new bedding mortar so that the process may be reversed in future if necessary. The fragments were cemented in place with a mortar of lime, finely powdered limestone and micronized calcium carbonate to provide support. Once the mortar was completely dry and fragments were found to be securely attached, the surface layers (gypsum formwork, tissue paper and Japanese paper) were removed (Figures 50 to 53). Finally, dust was carefully removed from all the surfaces that will not be accessible in future without fixed scaffolding.





Figures 50 to 53